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**Gaming console with sub pixel animation**

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**AUSTRALIA****Patents Act 1990****Aristocrat Leisure Industries Pty Ltd****ORIGINAL****COMPLETE SPECIFICATION  
STANDARD PATENT*****Invention Title:******Gaming console with sub pixel animation***

The following statement is a full description of this invention  
including the best method of performing it known to us:-

## *Gaming console with sub pixel animation*

### Introduction

The present invention relates to gaming machines of the type generally referred to as slot machines, fruit machines or poker machines, and in particular the invention provides an improvement to a game played on such a machine.

5        Players who regularly play gaming machines quickly tire of particular games and therefore it is necessary for manufacturers of these machines to come up with innovative game features that add interest to the games provided on such machines in order to keep the players amused and therefore willing to continue playing the game.

### Description of the Prior Art

10        Gaming or poker machines have been well known for many years and have more recently gained considerable popularity, with quite substantial amounts of money wagered on these machines. There is a growing tendency for Governments to legalise the use of gaming machines by licensing operators, with resulting revenue gains through licence fees and taxation of monies invested. The licensed operation of gaming machines is the subject of legislation and regulation. This regulation almost always dictates a minimum percentage payout for a gaming machine. For example, a  
15        minimum of 85% of monies invested must be returned as winnings, and manufacturers of gaming machines therefore must design their machines around these regulatory controls.

20        With the growth that has occurred in the gaming machine market there is intense competition between manufacturers to supply the various existing and new venues. When selecting a supplier of gaming machines, the operator of a venue will often pay close attention to the popularity of various games with their patrons. Therefore, gaming machine manufacturers are keen to devise games which are popular with players, as a mechanism for improving sales.

25        Many various strategies have been tried in the past to make games more enticing to players, including the commonly known double-up feature, whereby, if a player wins a particular game, they can then risk the winnings of that game in a double-or-nothing mode in which they gamble on a  
30

subsequent, and often different, game such as whether a red or black card will be the next card drawn.

Other techniques adopted in the past have been to provide complexity in the numbering and combinations of indicia which would result in a win, thereby hoping to convince the player that there is a greater chance of winning and to keep their interest in a particular game.

It has been noted over the years that players become bored with games after they have been at a site for a period of time and so clubs and casinos must regularly update machines with new games or at least change their location to give the players greater variety. Such changes are expensive and inconvenient for operators and therefore games that players do not tire of as quickly are highly desirable.

#### Summary of the Invention

The present invention provides a gaming console having display means, and game control means arranged to control images displayed on the display means, the game control means being arranged to play a game wherein a random event is selected and displayed on the display means and, if a winning event results, the console pays a prize, the game being of a style that displays a randomly selected outcome from a set of possible outcomes and pays prizes for the occurrence of predetermined winning outcomes belonging to the set of outcomes, the image displayed on the display means having a game display region and a thematic background region in which a background scene is displayed, the console characterised in that the image of the background scene changes with time to illustrate a progression of events in the image, whereby the overall appearance and character of the display changes with time.

In one embodiment the game is of a style which creates a matrix of symbols and pays prizes for the occurrence of predetermined combinations in the matrix.

Messages to the player may be displayed over the thematic background region.

Examples of scenes that would change include, an outdoor scene (city skyline, haunted house etc) which cycles through day and night, or displays weather changes such as the building of cloud banks, the rising or setting of the sun and moon, or the movement of other elements in the scene such as cranes in a city skyline. In a jungle scene, plants might grow, or in a space

scene, planets and stars might move in orbit or a star might supernova, or in a haunted house, a spider might build a web.

The background region may overlap with the gaming region, for example a background image of a spider's web may be displayed over the gaming region.

Preferably, the changes in background scenes would be slow so that they did not distract a player from playing the game. However, the speed of the image development would be related to the style of game and the theme and could vary greatly from one console to the next.

The changes in background scene may also include changes in colour, tone, contrast, and so on. For example, if the background scene represented a setting sun, then the rest of the background image may become darker over time.

In some embodiments the speed with which the background scene changes may be so slow that it is substantially unnoticeable to the user over a short period of time. In such embodiments the feel and character of the display may only change after some minutes or even hours have passed. The slow speed with which the background scene changes may be effected by moving the whole image a small distance at a time at certain discrete time intervals. For example, the image may be moved by a single pixel at certain discrete time intervals.

Alternatively, the slow speed with which the background scene changes may be effected by the use of fragmented animation of the image, whereby separate portions of the image are moved at separate times, giving the visual impression that the entire image moves by a distance that is less than the dimension of each portion. In such embodiments there are preferably a large number of separate portions of the image. More preferably, each pixel of the image forms a separate portion, and the fragmented animation may therefore provide the visual impression that the entire image is moving by less than a single pixel at a time. This may be called sub pixel animation. Embodiments may further provide some graphical smoothing to compensate for the slight distortion of the image that necessarily occurs when using fragmented animation.

The separate portions of the image may be moved one at a time. Alternatively more than one of the separate portions may be moved at the same time.

### Brief Description of the Drawings

Embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 illustrates a gaming console with a video simulation of a rotating reel display incorporating a first embodiment of the invention;

Figure 2 is a schematic diagram of a gaming console control circuit;

Figure 3 illustrates the display of a gaming console incorporating the invention, showing both the game display region and the thematic background region;

Figure 4 shows an embodiment in which a digital representation of a sphere is moving from left to right;

Figure 5 shows an embodiment in which simple graphical smoothing is applied to the moving image; and

Figure 6 shows an embodiment in which a number of images on the screen are moving in accordance with the invention.

### Detailed Description of the Preferred Embodiments

In the following detailed description the methodology of the embodiments will be described, and it is to be understood that it is within the capabilities of the non-inventive worker in the art to introduce the methodology on any standard microprocessor-based gaming console by means of appropriate programming.

Referring to Figure 1 of the drawings, the first embodiment of the invention is illustrated in which a gaming console 40, of the type having a video display screen 41 which includes a thematic background region 46 and a gaming region 47 displaying a plurality of rotatable reels 42 carrying symbols 43, is arranged to pay a prize on the occurrence of a predetermined symbol or combination of symbols.

In the gaming console 40 illustrated in Figure 1, the game is initiated by a push button 44, however, it will be recognised by persons skilled in the art that this operating mechanism might be replaced by a pull handle or touch sensitive screen or other type of actuator in other embodiments of the invention. The top box 45 on top of the gaming console 40 carries the artwork panel 35 which displays the various winning combinations for which a prize is paid on this console.

The program which implements the game and game feature is run on a standard gaming console control processor 100 as illustrated schematically in

Figure 2. This processor forms part of a controller 110 which drives the video display screen 141 and receives input signals from sensors 144. The sensors 144 may be touch sensors, a pull handle or another type of actuator in other embodiments of the invention. The controller 110 also receives  
 5 input pulses from a mechanism 120 indicating the user has provided sufficient credit to begin playing. The mechanism 120 may be a coin input chute, a credit card reader, or other type of validation device. The controller 120 further drives a payout mechanism 130 which for example may be a coin output.

10 The game played on the console shown in Figures 1 and 2 is a relatively standard game which includes a 3 by 5 symbol display and allows multiple pay lines. The game environment provided on the display also includes a special feature embodying the invention, the special feature being the provision of a thematic image adjacent to or surrounding or even partially  
 15 overlapping the gaming display. The thematic image is a dynamic image such that the overall appearance and feel of the console will change over time.

Figure 3 shows the video display 41 of a gaming console incorporating the special feature embodying the invention. A thematic background region  
 20 46 is displayed adjacent to the 3 by 5 display 47, and some or all of the background region 46 may be changed over time such that the overall appearance and feel of the console will change over time. In this case the background region 46 includes an image of the sun 50 which is changing  
 25 over time according to the invention. The sun 50 may be moved a pixel at a time, or by the use of sub pixel or fragmented animation. Additionally, other portions of the background region 48 may change over time. For example the tree 51 may cast a shadow which moves responsive to the location of the sun 50. The brightness, contrast and tone of the background region 46 may also  
 30 change responsive to the location of the sun 50, for example as the sun nears the horizon, the background region 46 may take a tone that is increasingly red, and the brightness may decrease.

Figure 4 illustrates the motion of an image 50 in accordance with the present invention. Image 50 represents the sun, and as time progresses the  
 35 sun 50 slowly moves across the background region. In this embodiment, the movement of the sun 50 is extremely slow, and is effected by first considering the image 50 as a number of separate image components. In the



present case the image components are the same size as individual pixels, and two image components of the sun 50 are displayed by pixels 60 and 61 respectively. Pixel 62 displays an image component of the background region. Movement of the sun from the position shown in Figure 4a occurs by moving one or more of the image components at certain times such that over time the location of the entire image 50 will change. As shown in Figure 4b, after a certain time, the image has 'moved' such that pixels 60, 61 and 62 all display image components of the sun 50. During this time, some of the image components of the image 50 have moved, and others have not. For example, the image component represented by pixel 61 in Figure 4a has moved, whereas the image component represented by pixel 60 has not. This gives the visual impression that the image 50 has moved over this time interval, but by less than one pixel.

Figure 5 shows an embodiment of the invention in which a simple form of graphical smoothing is applied after the movement of an image component of the image 70, the image component being represented by pixel 75 in Figure 5a. The image components represented by pixels 71 to 75 all have a certain colour and brightness, shown in Figure 5a as A to E respectively. Pixel 76 represents an image component of the background image. After a certain time interval and as shown in Figure 5b, the image component represented by pixel 75 in Figure 5a 'moves' so that it becomes represented by pixel 76, ie pixel 76 takes the colour and brightness E. Graphical smoothing is applied to provide an intermediate image component represented by pixel 75, the intermediate image component having a colour and brightness averaged from the brightness and colour of the pixels 74 and 76 on either side. Pixels 71-74 retain the same colour and brightness. Therefore, over this time interval, it appears as though the image 70 has moved to the right by less than a single pixel, and the distortion of the colour and brightness of the image is reduced by the use of graphical smoothing. Of course, more complex smoothing algorithms may be used to good effect in the present invention.

Figure 6 shows an embodiment of the invention in which a plurality of images 80-83 of the background region 46 are moving or changing shape in accordance with the present invention. The clouds 81 are progressing across the sky and changing shape, the moon 81 is slowly rising, the tree 83 may sway in the breeze, and a spider is slowly constructing a web 80. Note that

in this embodiment of the invention, part of the background region 46 overlaps the gaming region 47, in the form of the spider's web 80. The overlap does not prevent the user from determining whether or not a winning event has occurred. The embodiment shown in Figure 6 further includes  
5 messages to the player 85 which are shown over the thematic background region 46.

Although the invention has been described with reference to particular examples of the invention, it should be appreciated that it may be exemplified in other forms. For instance, when used, graphical smoothing  
10 may range from extremely simple methods, to complex image analysis and compensation methods, which are well known in the art.

The present invention may also provide a background image that moves at a speed that is noticeable to the user upon brief inspection. For example, clouds may scud quickly across the sky, or a meteorite may plummet to earth.  
15

Although the above embodiments relate to the movement of a part of the background region, the present invention may also provide a gaming console in which the entire background region changes over time, for example the background region may portray an outdoors scene which may  
20 'pan' over time.

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to  
25 be considered in all respects as illustrative and not restrictive.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A gaming console having display means, and game control means arranged to control images displayed on the display means, the game control means being arranged to play a game wherein a random event is selected and displayed on the display means and, if a winning event results, the console pays a prize, the game being of a style that displays a randomly selected outcome from a set of possible outcomes and pays prizes for the occurrence of predetermined winning outcomes belonging to the set of outcomes, the image displayed on the display means having a game display region and a thematic background region in which a background scene is displayed, the console characterised in that the image of the background scene changes with time to illustrate a progression of events in the image, whereby the overall appearance and character of the display changes with time.
2. A gaming console according to claim 1, wherein the game is of a style which creates a matrix of symbols and pays prizes for the occurrence of predetermined combinations in the matrix.
3. A gaming console according to claim 1 or 2, wherein messages to the player are displayed over the thematic background region.
4. A gaming console according to any one of claims 1 to 3, wherein the background region overlaps with the gaming region.
5. A gaming console according to claim 4, wherein a background image of a spider's web is displayed over the gaming region.
6. A gaming console according to any one of claims 1 to 5, wherein the changes in background scenes are slow so that they do not distract a player from playing the game.
7. A gaming console according to any one of claims 1 to 6, wherein the background scene portrays an outdoor scene which cycles through day and night.
8. A gaming console according to any one of claims 1 to 7, wherein the background scene portrays weather changes such as the building of cloud banks, the rising or setting of the sun and moon, or the movement of other elements in the scene such as cranes in a city skyline.
9. A gaming console according to any one of claims 1 to 8, wherein the background scene portrays a jungle scene in which plants grow.

10. A gaming console according to any one of claims 1 to 6, wherein the background scene portrays a space scene in which planets and stars move in orbit or a star turns supernova.

5 11. A gaming console according to any one of claims 1 to 6, wherein the background scene portrays a haunted house in which a spider builds a web.

12. A gaming console according to any one of claims 1 to 11, wherein the background scene changes over time to represent changes in colour, tone or contrast.

10 13. A gaming console according to claim 12, wherein a portion of the background scene represents a setting sun, and the remainder of the background scene becomes darker over time.

14. A gaming console according to any preceding claim wherein the speed with which the background scene changes is so slow that it is substantially unnoticeable to the user over a short period of time.

15 15. The gaming console according to claim 14, wherein the feel and character of the display only changes after some minutes or even hours have passed.

16. The gaming console according to claim 14 or 15, wherein the slow speed of image development is effected by moving the whole image displayed on the background region by a small distance at a time, at certain discrete time intervals.

17. The gaming console according to claim 16, wherein the image displayed on the background region is moved by a single pixel at certain discrete time intervals.

25 18. A gaming console according to claim 14 or 15, wherein the slow speed with which the background scene changes is effected by the use of fragmented animation of the image, whereby separate portions of the image are moved at separate times, giving the visual impression that the entire image moves by a distance that is less than the dimension of each portion.

30 19. The gaming console according to claim 18, wherein there are a large number of separate portions of the image.

20. The gaming console according to claim 19, wherein the display means comprises a video display unit having many pixels, and wherein each pixel of the image forms a separate portion, the fragmented animation providing the visual impression that the entire image is moving by less than a single pixel at a time.

21. The gaming console according to any one of claims 18 to 20, wherein there is provided some graphical smoothing to compensate for distortion of the image.

5 22. The gaming console according to any one of claims 18 to 21, wherein the separate portions of the image are moved one at a time.

23. The gaming console according to any one of claims 18 to 22, wherein more than one of the separate portions are moved at the same time.

24. A gaming console substantially as herein described and with reference to the accompanying drawings.

10

Dated this tenth day of August 1999

ARISTOCRAT LEISURE INDUSTRIES PTY LTD  
(Applicant)

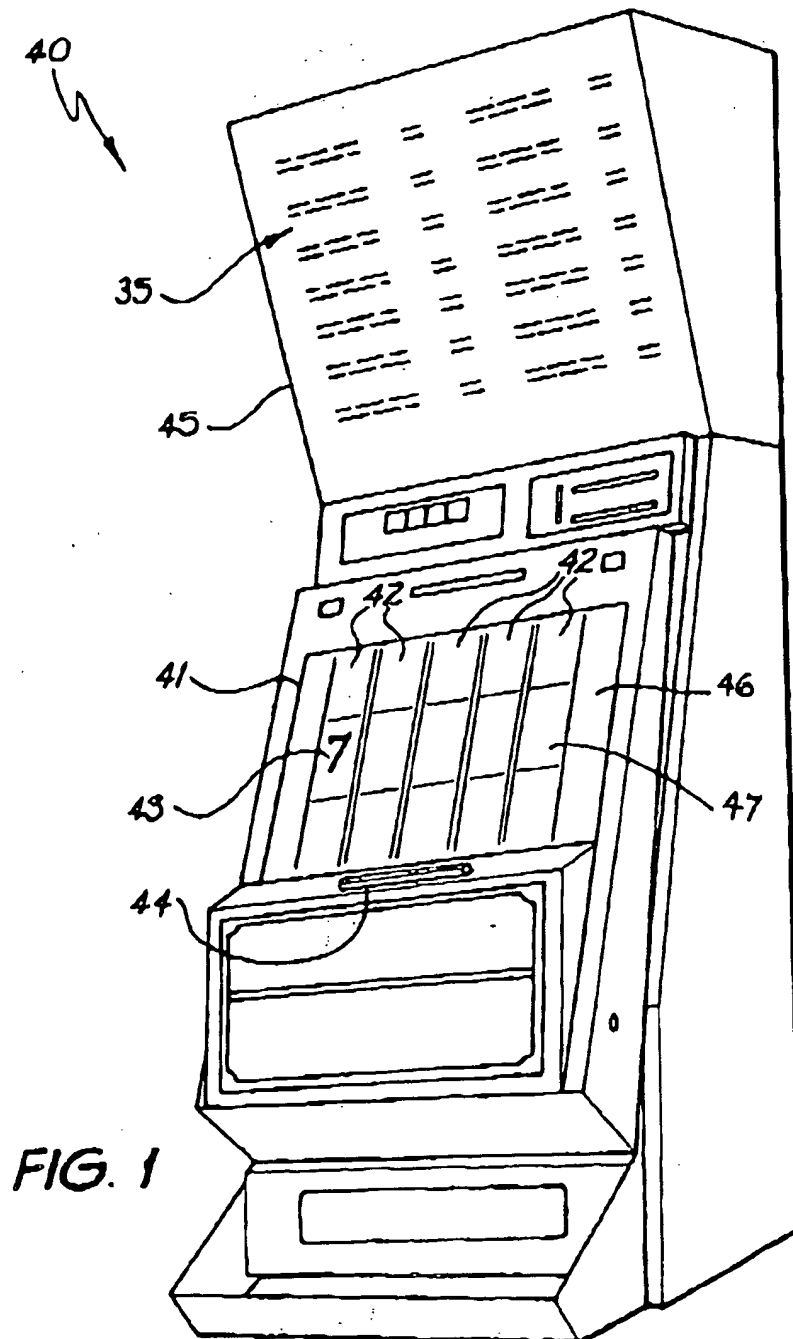
Patent Attorneys for the Applicant:

P B RICE & CO

# ABSTRACT

A gaming console 40 having display means 41, and game control means 100 arranged to control images displayed on the display means 41 is provided. The game control means 100 are arranged to play a game wherein a random event is selected and displayed on the display means 41 and, if a winning event results, the console 40 pays a prize. The game is of a style that displays a randomly selected outcome from a set of possible outcomes and pays prizes for the occurrence of predetermined winning outcomes belonging to the set of outcomes. The image displayed on the display means 41 has a game display region 47 and a thematic background region 48 in which a background scene is displayed. The console 40 is characterised in that the image of the background scene changes with time to illustrate a progression of events in the image, whereby the overall appearance and character of the display changes with time.





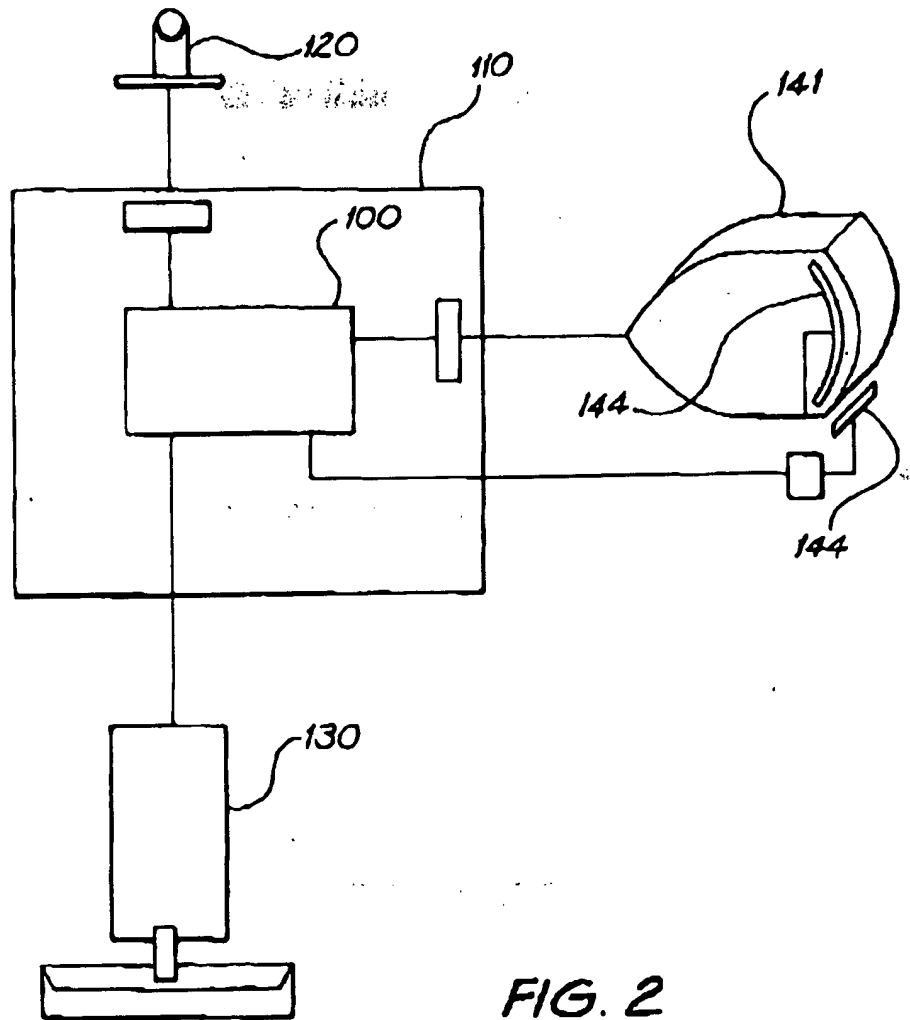


FIG. 2



10 00 00 43:07

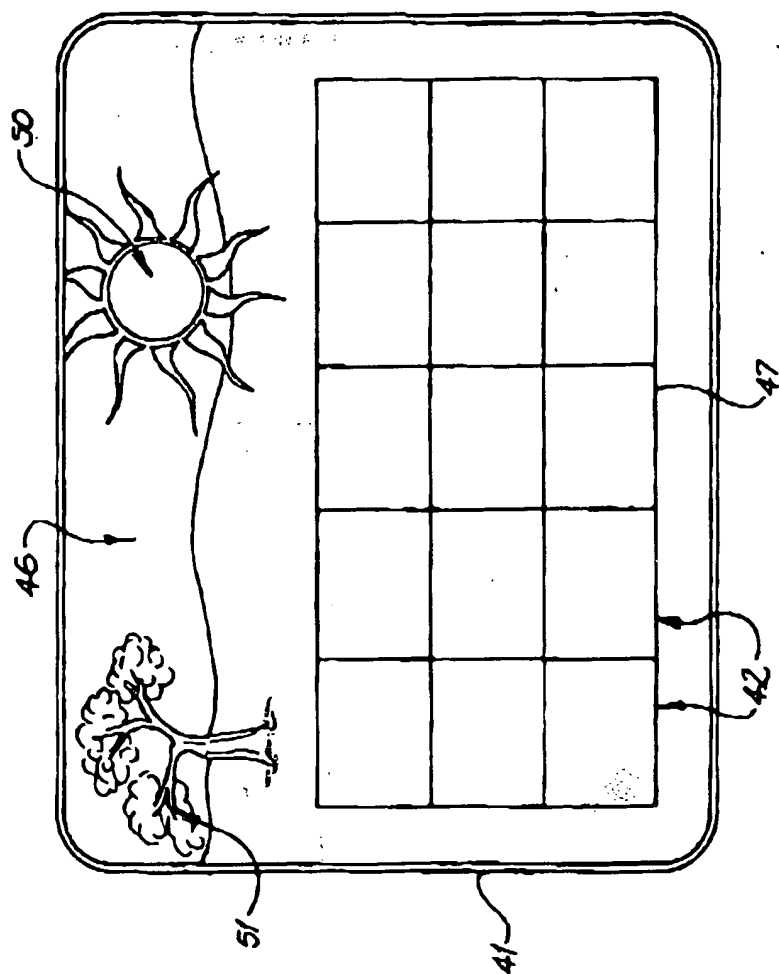


FIG. 3

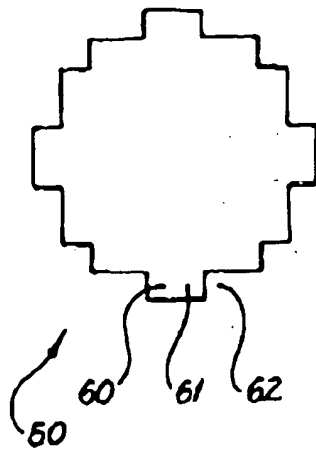


FIG. 4a

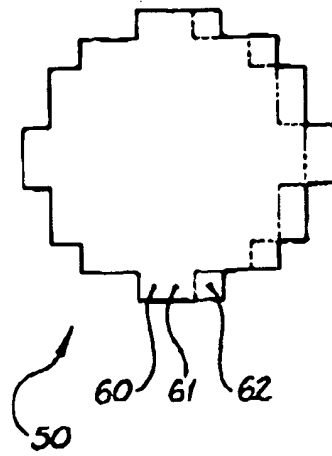


FIG. 4b

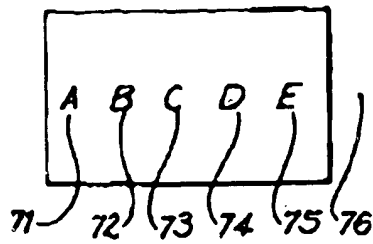


FIG. 5a

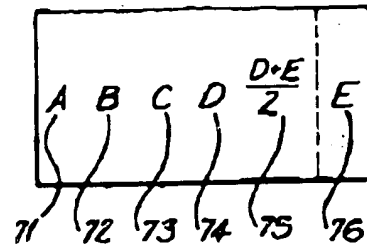


FIG. 5b

10 00 00 03401

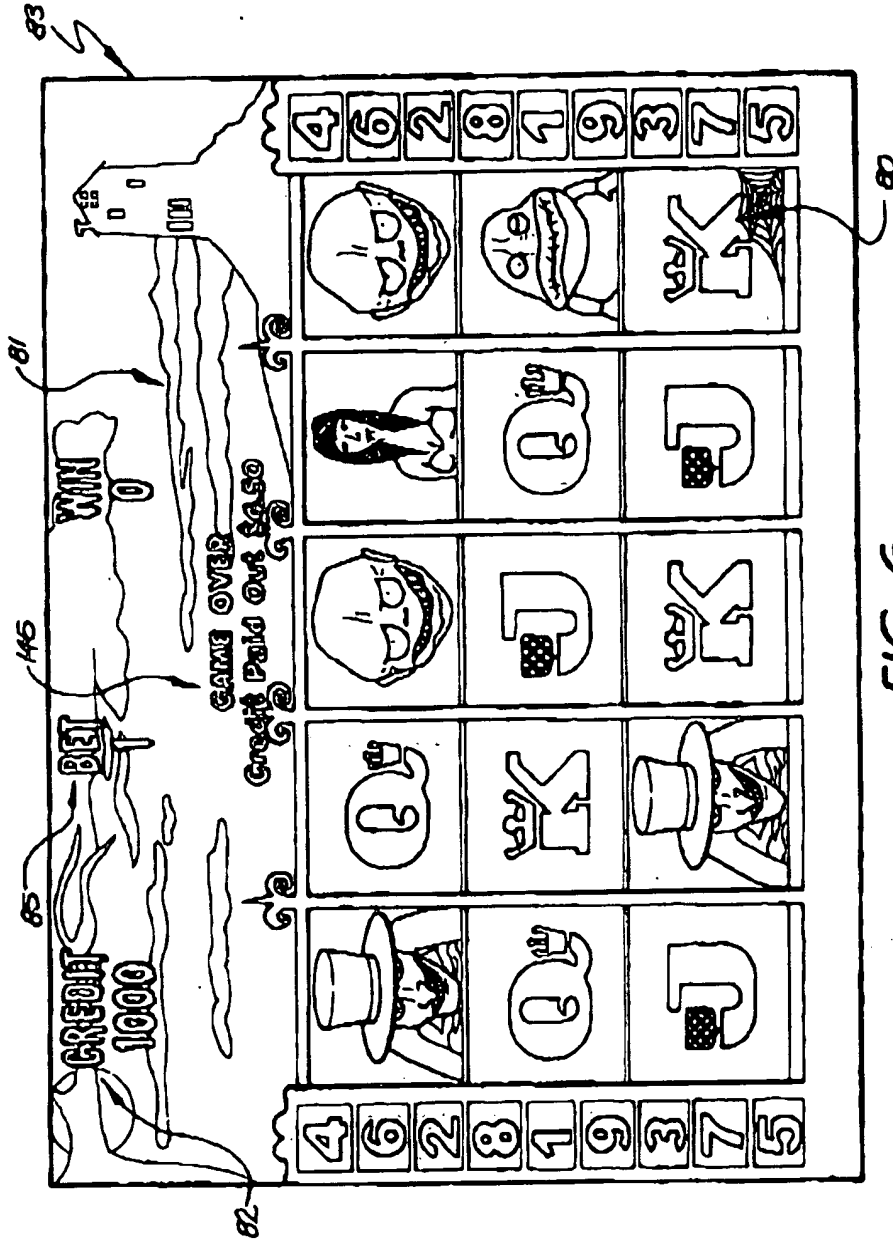


FIG. 6